10 Gb/s, SFP+ LC Package, BIDI
TX 1270/RX1330, TX 1330/RX1270 nm
Single Mode, 10-60 km Distance

OptixCom Connect with Light

SFP+ Bi-Directional (BiDi) Transceivers

Description

The bi-directional (BIDI) transceiver product is unique in that only one single fiber (single mode or multimode) is required to transmit and receive signals simultaneously. That means the total bandwidth capacity of an existing cable infrastructure can be doubled instantly. The typical design of a BIDI transceiver uses a 1270 nm LD to transmit and 1330 nm PD to receive, and vice versa for the matching one (1270 nm to receive and 1330 nm to transmit) at the other end to make a complete link.

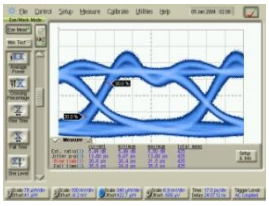
OptixCom's SFP+ transceivers are compliant with SFP Multi-Source Agreement (MSA). The BIDI transceivers utilize advanced filter optics to separate the two wavelength with more than 40 dB of isolation. These transceivers operate at 10 Gb/s for 10-60 km transmission distance with single fibers. The products are RoHS compliant.

Lead-Free

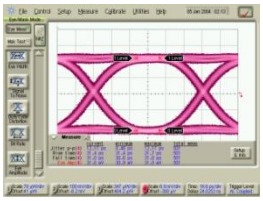
BD4-10000T2R3-AT*XX*K
BD4-10000T3R2-AT*XX*K
(*XX* = 10, 20, 40, 60)

10 Gb/s, 2^{31}-1 NRZ data eye pattern

TX



RX



Key Features

- Single mode, 10 G/s data rate
- TX1270/RX1330 & TX1330/RX1270 nm pair
- > 6 dB power budget for 10 km
- > 12 dB power budget for 20 km
- > 16 dB power budget for 40 km
- > 20 dB power budget for 60 km
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- Single LC connector optical interface
- AC coupling LVPECL differential I/O logics
- -40–85 °C operating temperatures available
- Compliant with 10G FC Fiber Channel
- RoHS compliant

Applications

- ✓ 10G Fiber Channel,
- ✓ 10 Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Computer cluster cross-connect

Ordering Information

Part Number: BD4-10000T2R3-AT***XX***K

10 Gb/s, Single Mode, SFP+ BIDI Transceiver, TX 1270 nm and RX 1330 nm, ***XX*** km reach, 0 – 70 °C.

Part Number: BD4-10000T3R2-AT***XX***K

10 Gb/s, Single Mode, SFP+ BIDI Transceiver, TX 1330 nm and RX 1270 nm, ***XX*** km reach, 0 – 70 °C.

* Add "-T" in the Part Number for -40–85 °C extended temperature range, i.e., BD4-10000T2R3-AT20K-T.

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
- T Transceivers	-40	25	85	°C
Data Rate	9.95	---	11	Gb/s
Supply Voltage (3.3V)	3.13	3.3	3.47	V

U.S.A. Office: Optix Communications, Inc.
17901 Von Karman Avenue, Suite 600,
Irvine, CA 92614
Tel: (949) 679-5712 Fax: (949) 420-2134

http://www.OptixCom.com
http://www.OpticalTransceiver.com
Email: Support@OptixCom.com

Germany Office: OptixCom GmbH
Magdeburger Strasse 18, 66121
Saarbruecken, Germany
Tel: +49 (0)681 4013-5172

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	*Tst*	-40	85	°C
Supply Voltage @ 3.3V	V_{CC}	-0.5	3.6	V
Input Voltage	V_{IN}	-0.5	V_{CC}	V
Relative Humidity	*R.H.*	0	85	%

General Transmitter Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.2	---	1.2	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Side Mode Suppression Ratio	*SMSR*	30	---	---	dB
Relative Intensity Noise	*RIN*	---	---	-128	dB/Hz
Rise/Fall Time (20% - 80%)	*Tr/Tf*	---	---	40	ps
TX Disable Voltage – High	V_{DH}	2.0	---	V_{CC}	V
TX Disable Voltage - Low	V_{DL}	0	---	0.8	V
TX Fault Output - High	V_{FH}	2.0	---	V_{CC}	V
TX Fault Output - Low	V_{FL}	0	---	0.8	V
TX Disable Assert Time	*Tass*	---	---	10	µs
TX Disable Deassert Time	*Tdisass*	---	---	1.0	ms
Time to Initialize	*Tas*	---	---	300	ms
TX Fault from Fault to Assertion	*Tfault*	---	---	100	µs
TX Disable Time to Start Reset	*Treset*	10	---	---	µs

Notes:

1. Module is designed for AC LVPECL coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

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General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage [1]	ΔV_O	0.3	---	0.7	V
Differential Input Impedance [2]	Z	---	100	---	Ohm
Optical Return Loss	OL	12	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	40	ps
RX Signal Loss Output - High	V_{RL+}	2.0	---	V_{CC}	V
RX Signal Loss Output - Low	V_{RL-}	0	---	0.8	V
RX Signal Loss Assert Time	T_{RL+}	---	---	100	µs
RX Signal Loss Deassert Time	T_{RL-}	---	---	100	µs
Serial ID Clock Rate	f_C	---	---	100	kHz

Notes:

1. Module is designed for AC LVPECL coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

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Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power [1]	P_O	+1	---	+5	dBm
Optical Wavelength (BD4-10000T2R3-AT40K)	λ_O	1260	1270	1280	nm
Optical Wavelength (BD4-10000T3R2-AT40K)	λ_O	1320	1330	1340	nm
Extinction Ratio	ET	3.5	---	---	dB
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
TX Disable Asserted	P_{OFF}	---	---	-30	dBm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength (BD4-10000T2R3-AT40K)	λ_C	1320	1330	1340	nm
Operating Wavelength (BD4-10000T3R2-AT40K)	λ_C	1260	1270	1280	nm
Receiver Overload	P_{max}	+1	---	---	dBm
Receiver Sensitivity [2]	P_I	---	---	-15	dBm
Receiver Sensitivity in OMA [2]	P_I	---	---	-13	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-17	dBm
RX Signal Loss – Deasserted	P_{RL-}	-32	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 μm SMF.
2. Test at 10 Gb/s, 2^{31} – 1 PRBS data pattern, and > $1x10^{-12}$ of Bit-Error-Rate (BER).
3. Power supply current: maximum 450 mA.

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